NOvA Experiment Status

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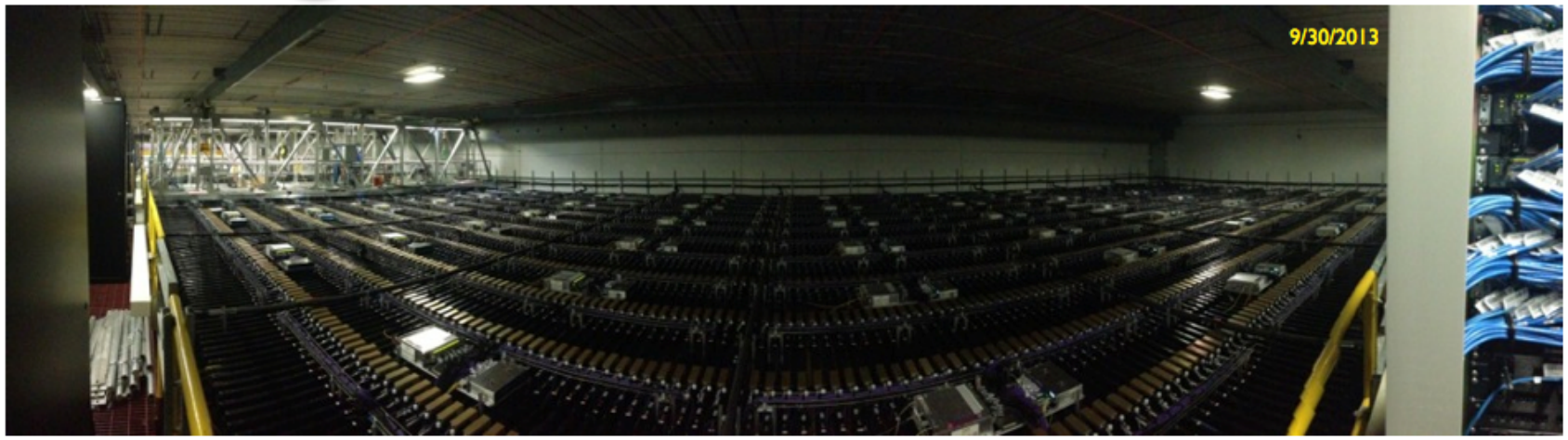
All Experimenter's Meeting, October 28, 2013

Far Detector Progress

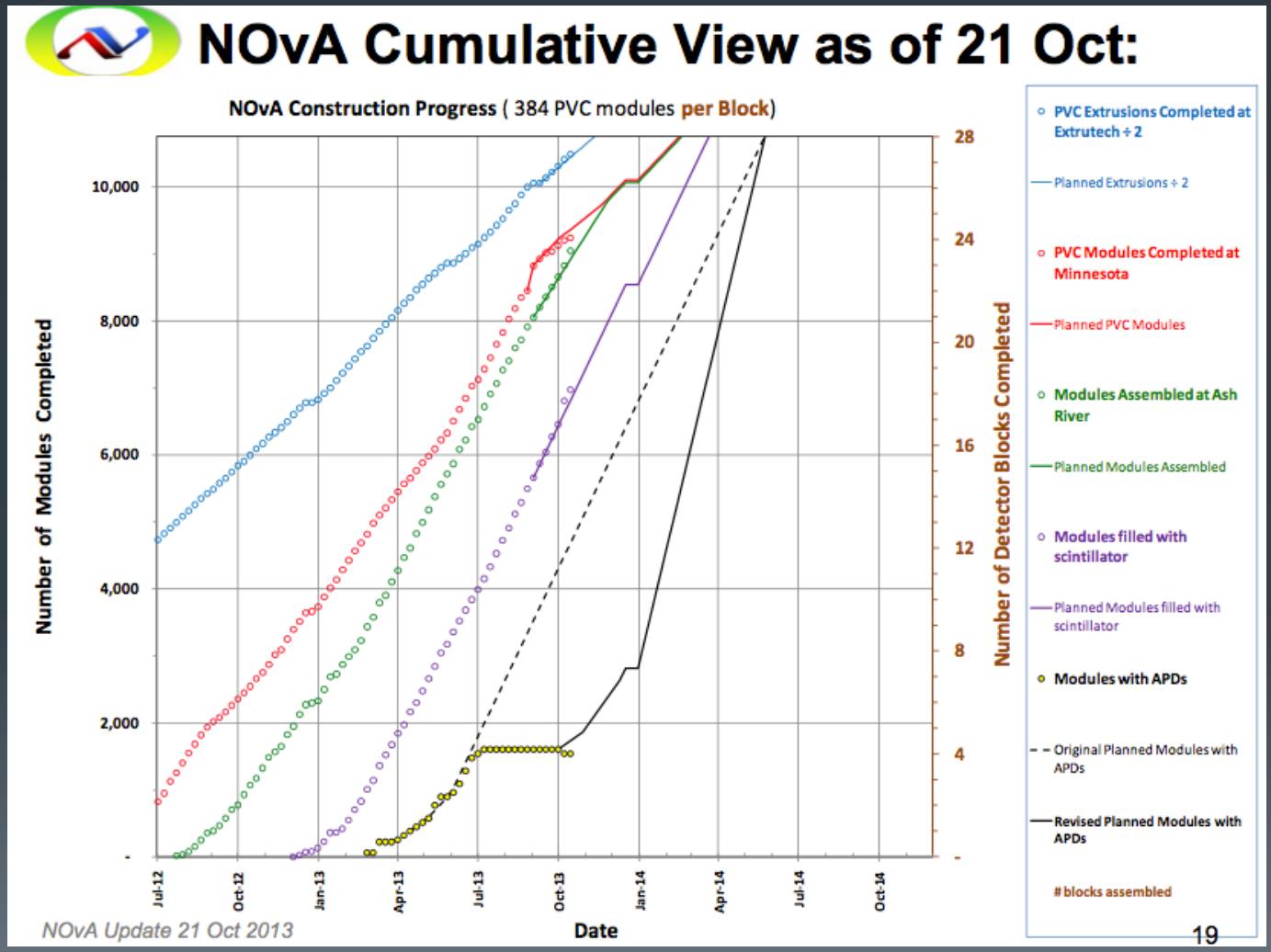
Position	DiBlock 14	13	12	11	10	9	8	7	6	5	4	3	2	1	
1			Installation	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	Vertical
2			Installation	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
3			Installation	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
4			Installation	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
5			Installation	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
6			Installation	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
7	DCM Avail	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	Horizontal
8	DCM Avail	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
9	DCM Avail	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
10	DCM Avail	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
11	DCM Avail	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
12	DCM Avail	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	

Block Installation Status

	Block 27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Status					Set	Set	Set	Set	Set	Filling	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled



FarDet Plan to Completion



Hunting Neutrinos at the FarDet

FD Neutrino Hunting By the Numbers

- 1 nu event with >10 hits and Kalman Track per 1.8e18 PoT (based on 'warm' MC)
- ~80% of these are through-going rock muon events, distinguishable from cosmic muon background on the basis of angle only.
- ~ 20% are semi-contained or contained, and distinguishable on the basis of both angle and, typically, on event topology from cosmic background.

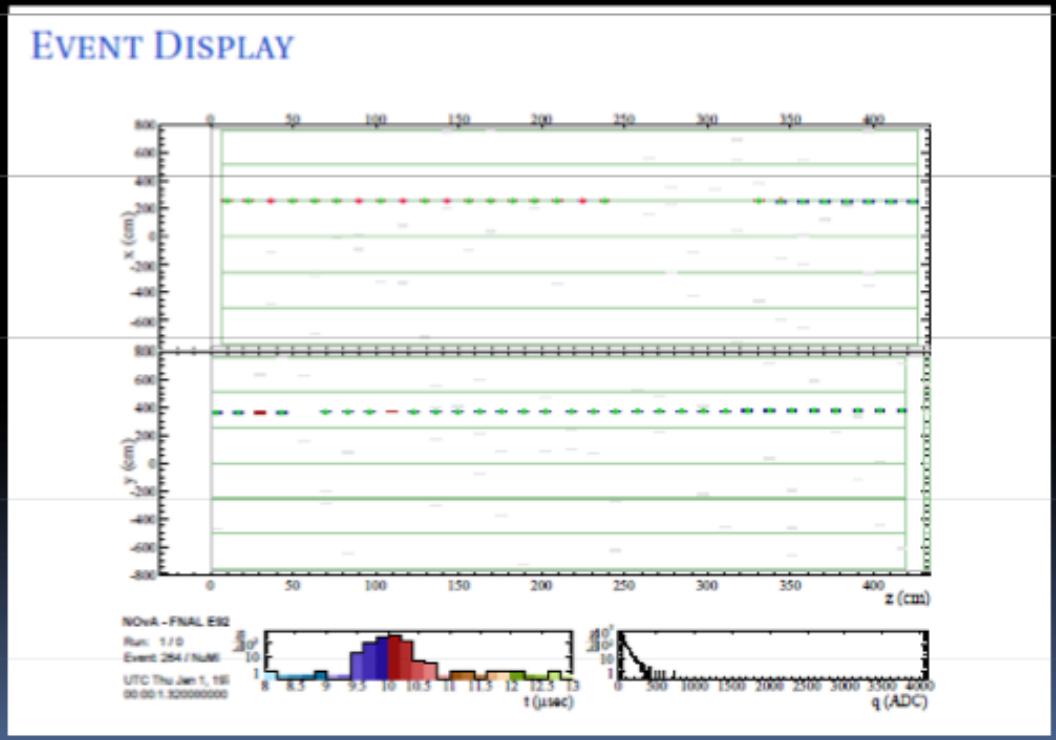
- Recent running has given ~ 4e18 PoT/week.

- At full efficiency, ~1.8 events/week of the first type are expected, and ~0.4 events/ week of the second type.

- This doesn't sound too bad! That full efficiency thing, that's the key.

Through-going Rock Events

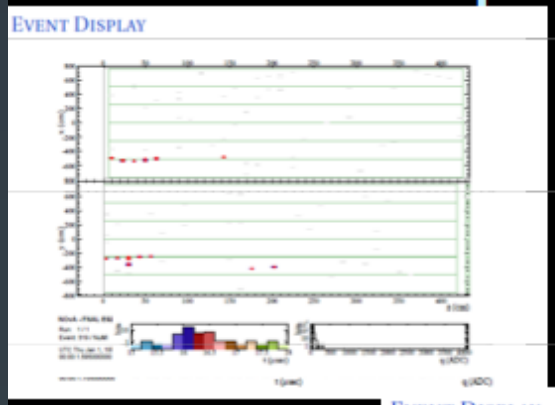
MC Through-Going Event
80% look like this (warm)

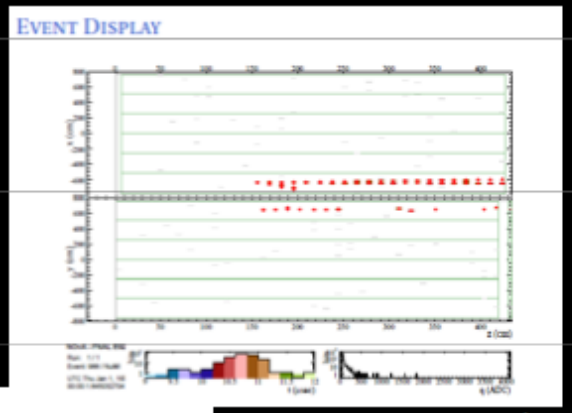


6.8 /month
@ eff=1

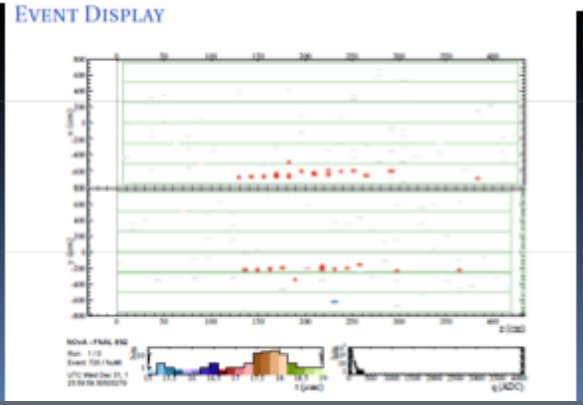
Contained Events

Contained and Semi-contained Event Sample





~0.6/month
@ eff=1



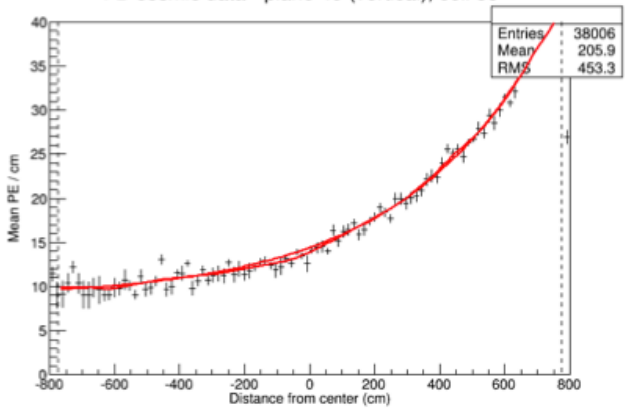
~0.6/month
@eff=1

~0.3/month
@eff=1

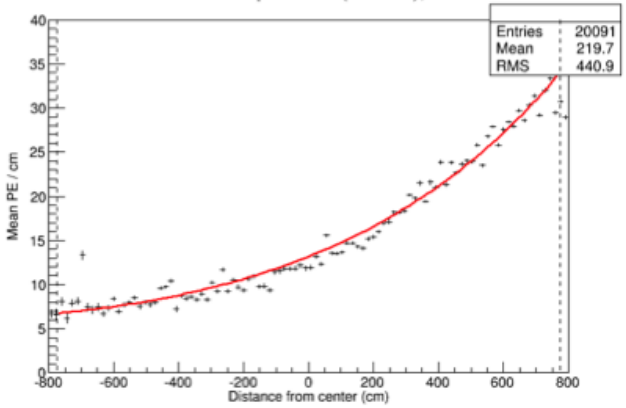
Calibration – Attenuation

Example good fits

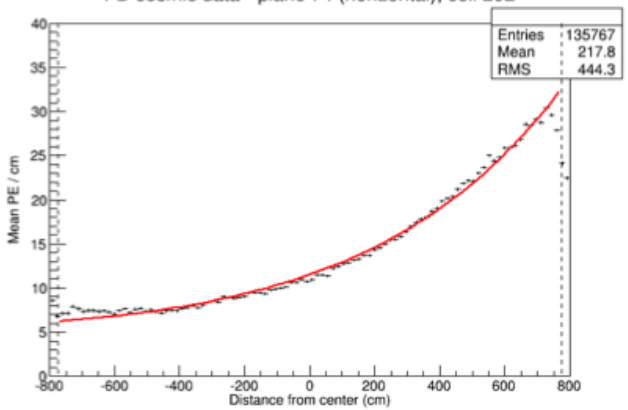
FD cosmic data - plane 49 (vertical), cell 88



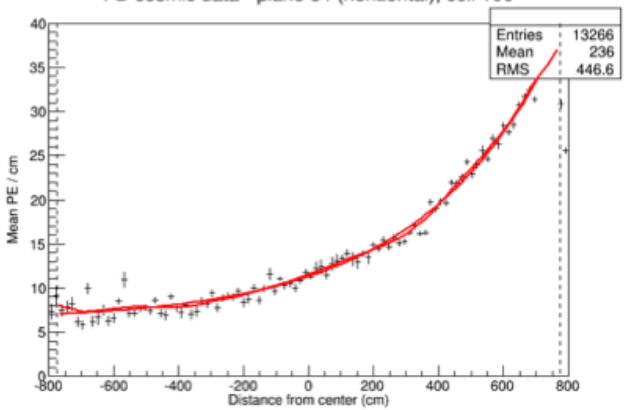
FD cosmic data - plane 87 (vertical), cell 345



FD cosmic data - plane 74 (horizontal), cell 292

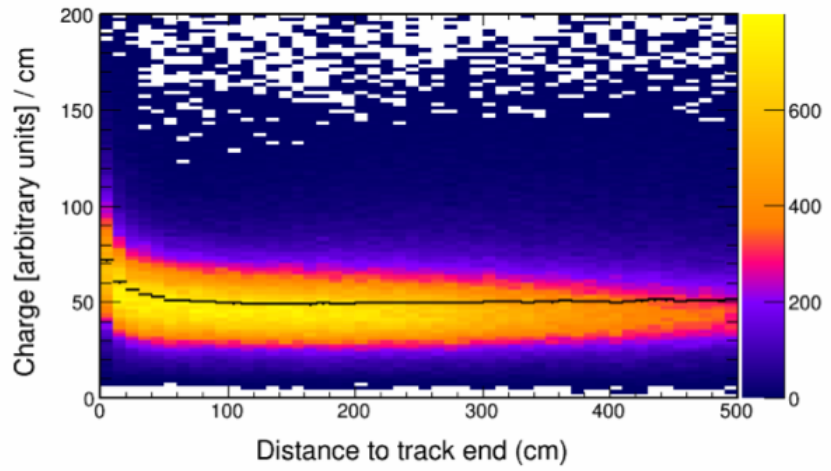


FD cosmic data - plane 84 (horizontal), cell 100



Calibration – Muon dE/dx

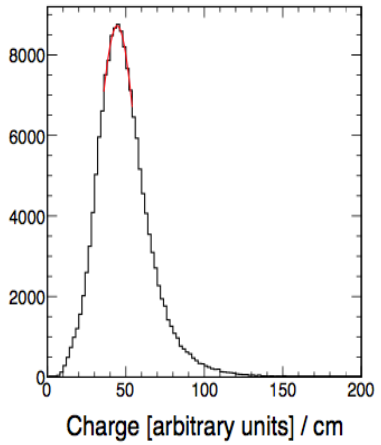
Cooled data: dE/dx



Charge (NOvA units – PECorr) / cm vs Distance to track end

Define Muon Energy Unit (MEU) in terms of this charge

Cooled data: MEU



Summary

- NDOS Prototype running smoothly, useful for testing of software/firmware/monitoring upgrades before rolling out at FarDet
- NDSBTest (Near Detector Surface Building Test) 30 APD test stand for cooling/monitoring tests of APDs
- FarDet – 2 diblocks running cold at full gain – very smooth running, 24th block (out of 28) in place, APD installation to resume
- NearDet – ½ of the Near Detector blocks are in place – finish in early January 2014, scintillator filling to start immediately after